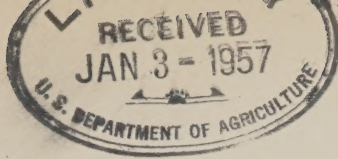


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Issued January 18, 1910.

United States Department of Agriculture,

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U.S. BUREAU OF PLANT INDUSTRY,

2A SEED DISTRIBUTION

WASHINGTON, D. C.

DISTRIBUTION OF COTTON SEED IN 1910.

The present will be the eighth distribution of cotton seed carried on by this office in cooperation with the cotton-breeding investigators of the Bureau of Plant Industry.

During the past seven years forty-three varieties of cotton have been distributed. These have all been bred by the experts of the Bureau of Plant Industry or selected by them because of special local value.

From the reports so far received it is evident that as a rule the seed sent out by the Department of Agriculture has proved better than that commonly obtainable. This year's distribution adds one variety to those previously sent out.

In general the Department will not duplicate the distribution of a variety, so that those who are pleased with the variety sent this year are urged to save their own seed.

^{J.}
LEON M. ESTABROOK,
Assistant in Charge.

Approved:

B. T. GALLOWAY,
Chief of Bureau.

WASHINGTON, D. C., *December 11, 1909.*

DISTRIBUTION OF COTTON SEED IN 1910.

For a number of years the Bureau of Plant Industry has distributed small quantities of cotton seed to growers. In selecting the seed for distribution new and little-known varieties have been chosen as far as possible, in order that these might be tested throughout the Cotton States. No variety has been chosen until the representatives of the Department of Agriculture have observed its behavior in the field.

The Bureau of Plant Industry has been at work on the problem of cotton breeding for several years, and the entire quantity distributed this year consists of seed of varieties or strains originated by the Bureau.

It is intended at the end of the season to follow up each package of seed with a circular in order to obtain information in regard to the value of the varieties distributed. Growers are therefore urged to make a careful test of the seed which they receive. Many growers might greatly increase their production by adopting other varieties of cotton.

For various reasons seed for the cotton crop has never had careful or widespread selection, and this fact means a great loss to cotton planters. Well-selected, productive strains of cotton require no extra outlay for fertilizer or cultivation to furnish an increase in yield.

METHODS OF SEED SELECTION.

Two methods of cotton-seed selection have been used in the past—"mass selection" and "individual selection." In the first, the planter picks out enough of his best plants to furnish seed for his next year's planting. This may be done by his most experienced picker or by the planter himself, and the amount of seed cotton thus selected is sufficient to gin at the ordinary customs gin. The gains by this method are ample to pay for the expense incurred, and in the hands of an exceptional man may give very good results; but they are not so sure or so rapid as by individual selection.

In individual selection the planter takes greater care in selecting his plants, and instead of picking all the selections together he numbers each plant by a tag and picks the seed cotton into a bag numbered correspondingly.

This seed is planted in separate rows the next year. The plot selected for this work should be as uniform as possible and of high

fertility. The seed will have to be dropped by hand. It is not necessary to delint the seed, but it is well to immerse the seed cotton in water just before planting. If half a lock of this wet cotton is dropped every 2 feet in the row and covered with an inch or two of loose soil with the foot, and then trodden upon, a good stand is almost certain. These rows should be given the same numbers as the parent plants and are called "progeny rows."

The reason for planting in progeny rows is that not all good cotton stalks have the power to transmit their good qualities to their progeny. In other words, a good stalk may be so by inheritance or it may be really very ordinary, owing its good qualities to some advantage in soil, fertilizer, or cultivation which neighboring plants have failed to get. Probably no one ever becomes well enough acquainted with cotton to be able to recognize this distinction in any given case.

A surprise is in store for the man who plants in progeny rows the best 25 plants he can find, this surprise consisting, first, in the apparent uniformity of the plants in each row and, second, in the wide variation between adjacent rows. By this means one is enabled to discard all the progeny of those plants which fail in any character. Without progeny rows it is impossible to eliminate these undesirable plants so thoroughly.

QUALITIES TO BE SELECTED.

The tests by which to select are the ones which will increase the money value of the crop and include, among others, productiveness, length of lint, earliness, percentage of lint to seed cotton, and size of boll. These are named in their order of importance and might all be included in the one supreme test of net money return per acre.

Increase in yield per acre for the South, as a whole, is more a question of fertilizer and cultivation than of selection. The yield is capable of much improvement, however, by selection, and the man who takes enough pride in his crop to select his seed will usually give good cultivation. To select for productiveness, plants which have given a larger yield than their neighboring plants without any evident advantage as to soil, space, or fertilizer should be chosen. The poorest part of the field is just as good for this selection as the best, except that among the stunted plants on poor soil the individual differences do not usually show so plainly as where the cotton plants have made a better growth. The cotton stalk which has ripened 8 bolls when the neighboring stalks with the same apparent opportunity ripened 5 is as much to be selected for productivity as the one having 40 bolls among plants bearing 25 bolls.

In making selections for greater length of lint, it is well to have a comb on which a $2\frac{1}{2}$ -inch scale, divided into sixteenths, is marked. The lint is combed out on the seeds and enough is then pulled off to measure on the scale. The lint should be of uniform length all over

the seed. Sometimes the lint is shorter on the pointed end, which defect is important, as it makes more waste in the process of spinning.

Earliness is of great importance everywhere, but especially in the weevil-infested region. Where weevil infestation is complete, the plants yielding the largest crop are apt to be earliest, or the number of bolls open at a certain midseason date might be taken as the measure of earliness.

The percentage of lint can not be accurately determined for individual plants without scales which are fairly delicate in adjustment. Variation in percentage of lint may be judged with sufficient accuracy by noting the density and completeness of the covering of the seed. If the yield of seed cotton is the same, of course the variety with a higher percentage of lint is more valuable.

In regions where labor is scarce, it is often necessary to pay a higher price for picking small-bolled cottons, so that size of boll may have its effect on the net money return of the crop.

METHOD OF PLANTING.

The quantity of seed sent out is necessarily small. If the grower has opportunity to plant it by hand it will plant 2 or 3 acres, but if it must be planted by a machine it may be rolled in dust or ashes after being moistened and can then readily be made to plant from 1 to 2 acres in an ordinary planter. This should produce enough to allow the grower to gin his crop separately in order to keep a complete record. In this way he may also secure unmixed seed of the variety for planting, if he so desires.

TRIUMPH, A SELECT STRAIN (South Carolina grown).

(Distribution arranged by E. B. Boykin.)

In the fall of 1904 a very promising plant of Triumph cotton was selected at Terrell, Tex. This plant was noticeable from the large size of its bolls and from its early maturity. Seed from this selection was planted at Lamar, S. C., in 1906. It gave great promise that year, and all the seeds produced were saved and planted in 1907, with like results. From that time on practically all of the seed has been used for planting, and it seems at present probable that the variety will supplant all others grown at Lamar.

The characters which are bringing the variety into popular favor are its very large bolls, excellent yielding qualities, high percentage of lint, and superior quality of lint. It is strongly believed that the variety will prove of great value to cotton growers in the Eastern States, as it has already been to growers in the West.

The original selection was grown near a number of other varieties, and it is likely that more or less cross-fertilization took place, as some plants occur which are not real Triumph. However, rigid selection

has been made and is being continued, for the purpose of eliminating all these aberrant types and to bring about further improvement.

The seed distributed was grown by Mr. E. M. Rogers, of Lamar, S. C., under the direction of the Bureau of Plant Industry.

TRIUMPH, A SELECT STRAIN (Texas grown).

(Distribution arranged by D. A. Saunders.)

Five years ago an exceptionally good yielding plant was found in a field of Triumph cotton with larger bolls and a higher percentage of lint than the average for that variety. In weighing up the progeny rows of that plant the next fall it was found to yield at the rate of 1,156 pounds of seed cotton to the acre. The lowest yield of any progeny row in that block was at the rate of 793 pounds to the acre.

The seed of this one row has been grown for increase for two successive seasons in a field planted to Triumph cotton. Both seasons this strain has shown a gain of 15 to 20 per cent in yield and a small increase in percentage of lint, or "gin turn-out." Last year it gave 40 per cent of lint, not counting the bagging and ties.

This variety (fig. 1) is briefly described as follows:

Plant strong and thrifty, beginning to fruit near the ground, close to the stalk, of stormproof type; limbs short jointed; bolls pendulous when mature,



FIG. 1.—A mature boll of Triumph cotton.

large ovate, blunt pointed, 5 locked, opening wide, and easy to pick; seeds medium in size; fuzzy or tufted, well covered; lint white, 1 inch to 1½ inches long, and of good quality; percentage of lint, 37 to 39; season of maturing, medium early.

SISTRUNK, A SELECT STRAIN.

(Distribution arranged by E. B. Boykin.)

The Sistrunk (fig. 2) is a short-staple Upland variety of cotton which has been under careful selection for three consecutive generations, with a view to increasing its earliness and productiveness. The original selections were made in Alabama from an unusually fine field of cotton, the variety not being known. Only such plants were selected

as were exceedingly productive and unusually early. The selections have been made each season with a view to intensifying the above characters, and it is believed that the variety has been greatly improved along these lines. A large percentage of the crops grown in 1908 and 1909 were open by September 10.

The following is a short description of the variety:

Plant medium sized, branching, with limbs of approximately equal length at bottom of the plant, becoming shorter toward the top and making a symmetrical, well-shaped type of plant; bolls small to medium sized, opening well, but not holding the cotton sufficiently well when allowed to stand long after opening; foliage very thin, a point which would adapt it to lands which produce too much growth; percentage of lint about 35; season of maturity early.

The seed of this variety distributed was grown by Mr. E. L. Gray, of Lamar, S. C., under the immediate direction of the Bureau of Plant Industry.

COLUMBIA, A LONG-STAPLE UPLAND VARIETY.

(Distribution arranged by E. B. Boykin.)

In the course of the cotton-breeding experiments which were formerly conducted by Dr. Herbert J. Webber for the Bureau of Plant Industry, special attention was given to producing new and improved long-staple Upland varieties. One strain which has been under very careful selection for six consecutive generations at Columbia, S. C., has shown very marked improvement and has been named the Columbia (fig. 3).

The following is a short statement of the methods used in producing the variety: In the summer of 1902 a plat of Russell Big-Boll cotton was grown in connection with Doctor Webber's experiments for the purpose of testing the variety in comparison with other sorts and making selections. Every plant in the plat was carefully examined and the lint combed to determine its length. The length of lint was found to be somewhat variable, in general being from 1 inch to $1\frac{1}{8}$ inches. About half a dozen plants were found with lint nearly $1\frac{1}{4}$ inches long, and one particularly good plant had lint averaging about $1\frac{3}{8}$ inches in length.



FIG. 2.—A mature boll of Sistrunk cotton.

Several of the best plants that had long lint were planted in 1903 by the plant-to-row method. An examination of the rows when the plants matured brought out the fact that the one plant selected in 1902 that had lint $1\frac{3}{8}$ inches long had reproduced its characters in a marked degree, while the rows planted from the seed of the other plants were only slightly better than the ordinary Russell cotton. The selections made in 1903 were therefore all taken from the progeny of this one superior plant. About 75 per cent of these plants



FIG. 3.—A mature boll of Columbia cotton.

produced lint $1\frac{1}{4}$ inches in length, and about 12 plants gave lint nearly $1\frac{3}{8}$ inches long. Seed was preserved from the 12 best plants only, and this was planted in an isolated plat in 1904 by the plant-to-row method. In 1904 several of the rows of plants were much below the standard set and only one of the rows was considered superior. All of the selections in this season were made from this superior progeny. In 1905 an isolated patch of about $1\frac{1}{2}$ acres was planted again by the plant-to-row method. In this season the variety

had been reduced to practical fixity of type and the breeding patch was exceptionally fine and fairly uniform. In 1905 some individual selections were made, after which a considerable number of good second-select plants were marked and saved for seed to plant a multiplication patch in 1906.

In 1906 a multiplication patch of 14 acres was planted with this second-select seed, and this patch produced 25,500 pounds of seed cotton and 7,359 pounds of lint, or 1,821 pounds of seed cotton and 528 pounds of lint to the acre. The lint sold on the market at Columbia, S. C., early in the season at 13 cents a pound. Had it been sold in a long-staple market later in the season it would have brought a much higher price. The lint from the breeding patch of 1906 sold later in the season for $19\frac{1}{2}$ cents.

Throughout the process of selection the aim has been to select plants having the Russell type of branching and boll, so that the plant of the Columbia is scarcely recognizable as distinct from the

Russell variety. The very large boll has also been retained and the variety is in every respect of true Upland type aside from its lint character.

The true Russell variety produces a large seed covered with dark-green fuzz. This character is very undesirable, owing to the discoloration of the lint if ginned while somewhat wet by the pulling off of the green fuzz and also owing to the green color giving undesirable linters. In breeding this variety by selection, therefore, special attention has been given to selecting a white seed. The great majority of the plants of the Columbia variety now produce white seed, but this character has not as yet been entirely fixed.

While the variety is now one of the best long-staple Upland sorts, it requires to be further improved in some characters. As will be seen from an examination of the yields of the 14-acre patch, the lint turn-out was only 29 per cent. In increasing the length of lint there has been a slight loss in the percentage of lint. The Russell variety, however, seldom averages more than from 30 to 31 per cent, owing to its very large seed. Practically speaking, this can not be considered a serious drawback to the variety if the yield of lint to the acre holds up, and it is believed that the yield to the acre will average as high as that of ordinary short-staple sorts grown under the same conditions.

In the selection of the variety up to the present time little attention has been given to increasing the percentage of lint. In the selections made in 1906, however, this feature was made one of the important points. It was found that the different selections varied in percentage of lint from 29 to $34\frac{1}{2}$. All of the selections from one row of plants averaged from 32 to 34 per cent.

The crop of 1907 showed a marked increase in the percentage of lint over that of 1906, and it is certain that the variety is greatly improved in this respect. Great care has been exercised to select seed plants having very strong lint, and as a result the initial strength of the lint in the Columbia variety is much greater than in the Griffin, the Sunflower, and the majority of the long-staple Upland varieties.

The tests of the Columbia variety made at various places in 1907 and 1908 show that in some places it is a thoroughly satisfactory cotton, while under other conditions it may prove somewhat disappointing. This is what would naturally be expected. Any long-staple cotton to give thorough success should be planted on fairly good soil, rich in vegetable matter, and must be well manured and well cultivated. Such thorough methods will pay.

Doctor Webber has had considerable experience with the long-staple Upland cottons, having grown and tested practically all of the known varieties, and considering all characters he believes the Columbia to be one of the most promising varieties of this class of cot-

ton. He strongly recommends growers to give this cotton a thorough trial for several years, being careful to select the seed for planting in accordance with the method suggested earlier in this paper.

Following is a short technical description of this variety:

Plant low, compact, of Russell type, having several long branching basal limbs, vigorous, prolific; bolls large to very large, ovate, blunt pointed, opening very wide, mainly 5 locked; seeds large, fuzzy, white or greenish, 8 to 10 per lock; lint very strong, from $1\frac{7}{8}$ to $1\frac{3}{4}$ inches in length, fine, silky, and very uniform in length; seeds moderately well covered, giving from 29 to 33 per cent of lint; season of maturing medium.

The fields of Columbia cotton from which the seed distributed this season was taken were grown by Messrs. R. L. Du Bose, Lamar, S. C., and by Col. D. J. Griffith, Columbia, S. C.

TROOK.

Trook cotton (fig. 4) is the result of a cross made in 1905 between selected plants of the Triumph and the Cook varieties. The object



FIG. 4.—A mature boll of Trook cotton.

of making this cross was to obtain a more productive and an earlier opening cotton with a higher percentage of lint. The variety is not entirely uniform as yet, but it has given such satisfactory yields

under weevil conditions that it seems best to make a preliminary distribution at this time. The following table shows the yield of the Trook variety compared with both a standard commercial big-boll cotton and a small-boll cotton under severe weevil conditions in the Red River Valley during the season of 1909.

Yield of seed cotton per acre at Denison and Shreveport.

Variety.	Denison.	Shreveport.	Average proportion of lint.
	<i>Pounds.</i>	<i>Pounds.</i>	<i>Per cent.</i>
King (selected)	950	1,300	30
Triumph	750	780	39
Trook	1,125	1,550	40.5

The Trook variety may be described as follows:

Plant of medium height, with one to several vegetative branches; fruiting branches many, very long, medium to short jointed; foliage small, dark green, open, rather hairy; bolls rotund, medium to large, 1 to 1½ inches in diameter; percentage of lint, 39 to 41.

By planting the Trook cotton by itself and making a careful selection in the fall of the best yielding plants and those with the best lint the planter will soon have an acclimatized variety of cotton yielding 40 per cent of lint or more.

The seed for this distribution was grown during the season of 1909 by Messrs. John Gorham, I. J. Mayfield, and James Pipkin, of Waco, Tex.; Mr. Louis Burns, of Cuero, Tex.; and Mr. T. P. Robinson, of Bartlett, Tex., for the Bureau of Plant Industry.

DILLON, A WILT-RESISTANT VARIETY.

(Distribution arranged by William A. Orton.)

Besides the foregoing, a wilt-resistant variety will be distributed this year. This has been bred by Mr. William A. Orton, of the Bureau of Plant Industry. A complete description of the wilt of cotton and efficient remedies for it are contained in Farmers' Bulletin No. 333, which may be had on application to the Secretary of Agriculture, Washington, D. C. The following description is extracted from this bulletin:

The first of the wilt-resistant varieties to be sent out has been named Dillon from the fact that the original selections were made in Dillon, S. C., in 1900. From 1902 to 1904 it was grown at Troy, Ala.; in 1905 and 1906, at Notasulga, Ala.; and during 1907, 1908, and 1909, at Lamar, S. C.

The parent variety was Jackson Limbless, a cotton greatly overexploited at the time of its introduction and not widely grown at the present time. The first variety test showed the Jackson to be

much more resistant than other races of cotton, and this quality has been greatly intensified by subsequent breeding. Preliminary distributions were made in 1905, 1906, and 1907, when small quantities of seed were sent out under the name "Wilt-Resistant Jackson" for experimental trials. It was found that this name led to confusion with the unselected original Jackson and that the new strain differed from the original in being more resistant, productive, and uniform, and to some degree in having bolls less closely clustered and easier to pick, seed of darker color, etc. For these reasons the improved strain sent out in 1908 has been named Dillon. A technical description follows:

Plant tall, erect, wilt resistant, productive, often with one, two, or three large basal branches; fruiting limbs reduced to clusters of bolls close to the main stalk; leaves medium size; bolls of medium size, 80 being required to yield 1 pound of seed cotton; bolls erect; seed small, average weight of 100 seeds 9 grams, covered with close, brownish green fuzz; staple medium to short, $\frac{3}{8}$ to 1 inch, white, straight; percentage of lint to seed cotton, 37.

The group of Upland varieties having clustered bolls is not very popular among farmers, some being unduly prejudiced against it. In part, however, this feeling is accounted for by the fact that the cotton is harder to pick than that of big-boll varieties. This difficulty in picking is counterbalanced by the stormproof quality, as Dillon has held all its cotton through storms that have blown to the ground all cotton open on other varieties. Greater objections are raised on this score in sections where big-boll varieties are grown than where the prevailing kinds are of the King or Peterkin groups. Further objection is also made to the cluster varieties because the cotton is more trashy after storms, due to fragments of the involucre adhering to the lint.

Breeders should seek to select easy-picking strains of Dillon. The bolls should also be bred to have separate pedicels, thus opening the clusters. Those who object to its faults should not lose sight of the fact that even on land not infected by wilt the Dillon variety has been proved to rank high in productiveness, and on infected land it will yield many times as much as nonresistant kinds. A field in South Carolina where cotton had previously been a complete failure from wilt, even when highly fertilized and intensively cultivated, yielded $1\frac{1}{2}$ bales per acre of Dillon cotton in 1907.

The Dillon variety appears to succeed best in the northern portion of the cotton belt, including North Carolina, South Carolina, and parts of Georgia.

The seed for this distribution was grown in 1909, by Mr. J. R. Register, of Lamar, S. C., under Mr. Orton's supervision.

REPORT OF RESULTS DESIRED FOR PUBLICATION.

In order to determine the comparative value of the different varieties of cotton in various cotton-growing regions, the growers receiving this seed are requested to give it a thorough trial in comparison with the variety or varieties that they ordinarily grow and be prepared in the autumn of 1910 to report the results of the test to the United States Department of Agriculture. A report will then be requested covering the following points:

- (1) Character of the soil.
- (2) Character of the season.
- (3) Total yield of seed cotton produced. (Determined by actual weighing.)
- (4) Total yield of lint produced. (Determined by actual weighing.)
- (5) Size of patch grown. (Determined by actual measurement.)
- (6) Yield per acre. (Estimated from the patch grown.)
- (7) Rating of the new variety for your section—whether excellent, good, fair, or poor.
- (8) Name of the variety ordinarily grown by the planter making the test.
- (9) Yield of the ordinary variety this year on the same soil as the variety under consideration.

It is especially requested that growers carefully note the points just enumerated in order that they may secure the necessary data and be ready to supply accurate information when it is called for next autumn. If sufficiently accurate data are furnished, a report will be compiled and issued giving the results of the various trials in all sections, and this report will be sent to all planters cooperating in the experiment. In this way it is hoped to obtain valuable and reliable information regarding the varieties best adapted to various sections of the cotton belt.

Growers receiving this seed who are willing to cooperate with the Department of Agriculture in making the above test are requested to fill in and return the accompanying franked postal card, which requires no postage.

D. N. SHOEMAKER,
Expert.



